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TRANSMITTAL FORM

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Total Number of Pages in This Submission

Application Number	10/633,439
Filing Date	August 1, 2003
First Named Inventor	Donald J. Frasier
Art Unit	1725
Examiner Name	Len Tran
Attorney Docket Number	RORO-225

ENCLOSURES *(Check all that apply)*

- [ ] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
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  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
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- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
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Remarks

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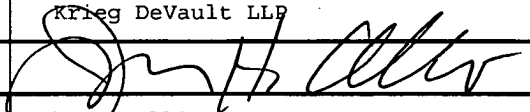
Signature			
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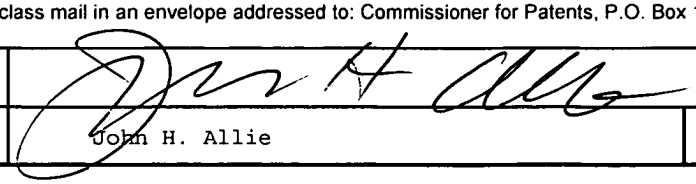
Signature			
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Art Unit:	1725
Confirmation No.:	4549
Application No.:	10/633,439
Title:	METHOD AND APPARATUS FOR PRODUCTION OF A CAST COMPONENT
Inventor:	Donald J. Frasier
Filing Date:	August 1, 2003
Attorney Docket No:	RORO-225
Examiner:	Tran, Len

Certificate Under 37 CFR 1.8(a)

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on March 10, 2008

(Signature)

John H. Allie

(Printed Name)

AMENDED APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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Alexandria, VA 22313-1450

Sir:

Pursuant to the Reinstatement of Appeal filed with the United States Patent Office on June 27, 2007 in connection with the above-indicated application, an Appeal Brief according to 37 CFR § 41.37 is provided. A Petition to Request an Extension of Time to and including January 28, 2008 was previously filed, along with a credit card

authorization form for the requisite fee under 37 CFR § 41.20 (b)(2) and 37 CFR § 1.17(a)(3). The Commissioner is authorized to grant any further extensions of time, and charge any deficiency or credit any overpayment to Deposit Account No. 12-2424, but not to include issue fees.

I. REAL PARTY IN INTEREST

Per 37 CFR §41.37(c)(1)(i), the real party in interest is Rolls Royce Corporation, the assignee of record, which is a subsidiary of Rolls-Royce PLC.

II. RELATED APPEALS AND INTERFERENCES

Per 37 CFR § 41.37(c)(1)(ii), the applicants, the applicants' legal representative, and the assignee wish to make the U.S. Patent Office aware of another Notice of Appeal filed in Application No. 11/089,808. An appeal brief is due February 24, 2008. A prior appeal brief was submitted in the present application on November 6, 2006. The Examiner reopened prosecution and has resulted in reinstatement of the present appeal. The applicants, the applicants' legal representative, and the assignee are unaware of any other related appeals or interferences which will affect, be directly affected by, or have a bearing on the Appeal Board's decision in the present appeal.

III. STATUS OF CLAIMS

Per 37 CFR §41.37(c)(1)(iii), the status of the claims is as follows. Claims 1-36, 50-62 and 81-169 have been cancelled. Claims 37-49 and 63-80 are pending. Claims 37-49 and 63-80 stand rejected, and are being appealed on the grounds further explained hereinafter. The claims are presented in the Claims Appendix in accordance with 37 CFR §41.37(c)(1)(viii).

IV. STATUS OF AMENDMENTS

Per 37 CFR §41.37(c)(1)(iv), no amendments have been filed subsequent to taking this Appeal.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Per 37 CFR §41.37(c)(1)(v), the following summarization provides a concise explanation of the subject matter defined in each of the independent claims involved in the appeal. This summarization refers to pages 48-50 and 64-69 of the present application and the figure designations of the present application, and all page and line numbers refer to the corresponding text of the present application.

Independent claim 37 is directed to an apparatus for pouring a molten metal, an exemplary embodiment of which is illustrated in Fig. 52 and described on page 64 line 13 to page 66, line 4 of the present application. The apparatus includes a crucible 122 having a bottom wall member 701 with an aperture 700 formed therethrough. The apparatus further includes an upstanding first tube 257 positioned within crucible 122 having a first end located around the aperture 700 and coupled to the bottom wall member 701, another second end that is closed, and at least one entrance 252 allowing the passage of molten metal from the crucible 122 to the first tube 257. The apparatus further includes an upstanding second tube 256 located within the first tube 257 having one end coupled to the bottom wall member 701 and in fluid communication with the aperture 700, another end defining an inlet and a cavity adapted for receiving a volume

of molten metal, and a passageway 251 extending along the second tube for the passage of the molten metal from an entrance to the inlet.

Independent claim 63 is directed to an apparatus including a mechanical housing, a crucible adapted to receive a metal material therein, the crucible positioned within the housing, and a heater positioned adjacent the crucible for heating the crucible and melting the metal received within the crucible, an exemplary embodiment of which is illustrated in Figs. 33, 52, 53A, 53B, 53C, 53D and 53E, and described on page 48, line 16 to page 50, line 19, page 64 line 13 to page 66, line 4, and page 67, line 14 to page 69, line 6 of the present application. The apparatus includes a pressure controlled precision pour assembly 125 positioned within the crucible 122. The pour assembly 125 has an outer cavity with at least one entrance for the passage of melted metal material from the crucible 125 to the outer cavity and an exit for the passage of melted metal material to an inner metering cavity. The pour assembly has a first state wherein the inner metering cavity receives melted metal material from the outer cavity until the inner metering cavity is full and a second state wherein the flow of melted metal material to the inner cavity is stopped and the melted metal material within the inner metering cavity is discharged.

Independent claim 69 is directed to an apparatus for dispensing a molten metal, an exemplary embodiment of which is illustrated in Figs. 33, and 52a, and described on page 48, line 16 to page 50, line 19, and page 66, line 5 to page 67, line 13 of the present application. The apparatus includes a mechanical housing having a first chamber 117 with a first pressure and a second chamber 118 with a second pressure.

The apparatus includes a crucible 651 positioned within the first chamber 117 of the mechanical housing and adapted to receive a stock of unmelted metal material 137 therein. The apparatus includes a heater positioned adjacent the crucible 651 and adapted for heating the crucible and at least a portion of the unmelted metal material therein to a molten metal state, wherein the crucible holds the volume of molten metal melted by the heater therein. The apparatus includes a tube 653 having a first end and a second end with a flow communication passageway therebetween, the first end is positioned beneath a surface of the volume of molten metal within the crucible and a second end positioned in fluid communication with the second chamber and defining a discharge aperture. The apparatus includes a pressure differential device within the first chamber and acting on the volume of molten metal to increase the pressure thereof and cause molten metal to flow through the passageway and out of the second end, the pressure differential device is defined by at least a portion of the unmelted metal material 137. A further exemplary embodiment according to claim 69 is illustrated in Fig. 52 and described on page 64 line 13 to page 66, line 4 of the present application.

Independent claim 72 is directed to an apparatus for pouring a molten metal, an exemplary embodiment of which is illustrated in Figs. 33, and 52a, and described on page 48, line 16 to page 50, line 19, and page 66, line 5 to page 67, line 13 of the present application. The apparatus includes a mechanical housing 651 with a bottom wall member and an interior volume adapted to hold a molten metal. The apparatus includes a molten metal delivery member 653 having a first molten metal inlet end adapted to receive molten metal from below the surface of the molten metal within the

interior volume and a second molten metal outlet end with a passageway therebetween. At least a portion of the delivery member 653 is positioned within the mechanical housing 651. The passageway has a first passageway portion and a second passageway portion and a inflection portion 655 wherein the direction of molten metal flow changes. In a first discharge mode a first direction of molten metal flow within the first passageway portion is from the molten metal inlet to the inflection portion 655 and from the inflection portion 655 through the second passageway portion in a second direction to the outlet. A further exemplary embodiment according to claim 72 is illustrated in Fig. 52 and described on page 64 line 13 to page 66, line 4 of the present application.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Pursuant to 37 CFR §41.37(c)(1)(vi), review of the following issue is presented in this appeal: the rejection of claims 37-49 and 63-80 under 35 U.S.C. § 103(a) based upon U.S. Patent No. 5,335,711 to Paine (hereinafter "Paine") in view of U.S. Patent No. 3,608,621 to Bollig et al. (hereinafter "Bollig").

VII. ARGUMENTS

The following remarks address the grounds of rejection in accordance with 37 CFR § 41.37(c)(1)(vii). The only rejection in the present application is of claims 37-49 and 63-80 as obvious under 35 U.S.C. § 103(a) based upon Paine in view of Bollig. The seminal case directed to application of 35 U.S.C. § 103 is *Graham v. John Deere*,

383 U.S. 1, 148 USPQ 459 (1966). From this case, four familiar factual inquiries have resulted. The first three are directed to the evaluation of prior art relative to the claims at issue, and the last is directed to evaluating evidence of secondary considerations. *See*, MPEP §2141.

The examiner bears the burden of establishing a prima facie case of obviousness. *See*, *In re Warner*, 379 F.2d 1011, 1016, 154 USPQ 173 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). To meet this burden, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *See*, MPEP § 2142, *citing In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). For the following reasons, these criteria have not been met and a prima facie case of obviousness has not been established.

A. The Asserted Combination Fails to Create a Prima Facie Case of Obviousness Since it Changes the Basic Principle of Operation of Paine

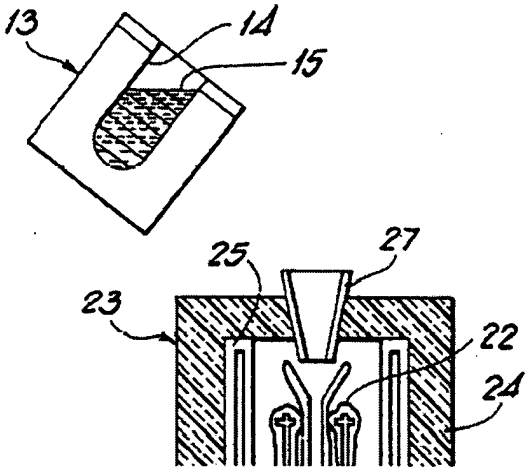
If a proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the

references are not sufficient to render the claims *prima facie* obvious. *See*, MPEP 2143.01, *citing In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). *In re Ratti* reversed the rejection of claims directed to an oil seal comprising a bore engaging portion with outwardly biased resilient spring fingers inserted in a resilient sealing member. The primary reference relied upon in a rejection based on a combination of references disclosed an oil seal wherein the bore engaging portion was reinforced by a cylindrical sheet metal casing. The court reversed the rejection "since the suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate." *In re Ratti*, 270 F.2d 810, 813, 123 USPQ 349, 352 (CCPA 1959), cited by MPEP 2143.01.

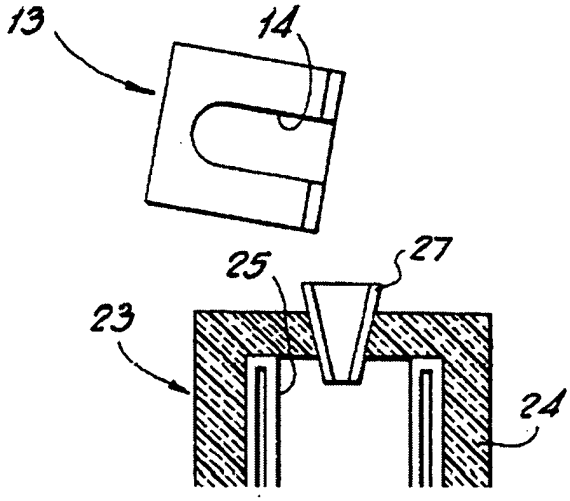
The Examiner's rejection suffers from the same deficiency as the rejection in *In re Ratti*. The rejection proposes modifying the Paine reference "to have an outer tube and an inner tube as taught by Bollig et al. in Paine ..." Office Action, page 3, lines 17-18. This modification would require a substantial reconstruction and redesign of the Paine reference and would change Paine's basic principle of operation.

Paine discloses a system that pours molten metal using a conventional tilt pour crucible: "[c]ontained in the chamber 11 is a coil box assembly 13 having induction heating coils (not shown) and crucible 14; the assembly 13 being mounted such that it may be tilted to pour the molten metal 15 in known manner." *See*, Paine, column 5, lines 20-24 (underlining added); *also see* column 6, lines 64-66 ("Operation of the

apparatus [of Figs. 3 and 4] is essentially similar to that described with reference to FIGS. 1 and 2."). The system in Paine is a vacuum casting process and therefore chamber 11 has a port 12 connected to a vacuum pump. *See*, Paine, column 5, lines 18-20. This principle of operation is illustrated in the following portions of Figs. 1 and 2 of Paine:



Portion of Fig. 1 of Paine



Portion of Fig. 2 of Paine

Assuming *arguendo* that the asserted combination of Paine and Bollig would even be operative, it would require a substantial redesign of Paine's crucible that would change its basic tilt-pour principle of operation. Bollig describes a system for controlling the flow of molten metal from a tundish 3 into a continuous casting mold 1. *See*, Bollig Fig. 1 and column 1, lines 27-31. Bollig does not disclose a tilt pour system for discharging a rather finite quantity of molten metal. Rather, Bollig describes a system where molten metal is introduced into an annular space between a casting tube 4 and a

rising tube 5. *See*, Bollig Fig. 1 and column 2, lines 10-28. A gas permeable block 9 is disposed in the bottom of the annular space between the tubes 4 and 5 and includes a channel 10a for distributing gas supplied by pipe 12 to the molten metal. *See*, Bollig Fig. 1 and column 2, lines 18-23. The "[m]olten metal in the tundish enters the rising tube 5 through the opening 6 and 7 where it mixes with a gas, preferably an inert gas, so that the mixture rises up and flows over the top of the casting tube 4 and down through the casting tube into the mold 1. " *See*, Bollig Fig. 1 and column 2, lines 24-28. Even if system of Bollig could somehow be added to the crucible of Paine, this combination would require a substantial redesign of Paine that would change Paine's basic tilt pour principle of operation. For at least this reason, the asserted combination of Paine and Bollig fails to create a prima facie case of obviousness.

B. The Asserted Combination Fails to Create a Prima Facie Case of Obviousness Since Attenhofer Teaches That it Would Render Paine Unsatisfactory for its Intended Purpose

It is well established that, "an applicant may rebut a prima facie case of obviousness by showing that the prior art teaches away from the claimed invention in any material respect." *In re Peterson*, 315 F.3d 1325, 1331, 65 USPQ2d 1379 (Fed. Cir. 2003). Furthermore, if a proposed modification renders a reference being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *See*, MPEP 2143.01, *citing In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

As stated above, the Examiner's proposed combination is to add the system of Bollig to Paine. *See*, Office Action, page 3. Paine teaches a system that is able to produce equiaxed, directionally solidified and single crystal components in the same type of furnace with the minimum amount of alternation. *See*, Paine Column 3, lines 16-18. According to Bollig an inert gas is introduced into the system so that there is "mixing [of] the molten metal in the rising tube [5] with gas and thereby raising its metal level as compared to the tundish metal level." *See*, Bollig Column 1, lines 33-35. The introduction and mixing of an inert gas into the molten metal the Applicants believe will cause significant issues in casting of components of superalloys conventionally utilized in making directionally solidified and/or single crystal structures. Therefore, the proposed combination of the Bolling system in Paine would render Paine unsatisfactory for casting equiaxed, directionally solidified and single crystal components.

The Examiner reasoned "it would have been obvious to an ordinary skill in the art at the time applicant's invention was made to have an outer tube and an inner tube as taught by Bollig et al, in Paine, in order to provide gas mixing with metal at the lowest part of the crucible." *See*, Office Action, page 3, lines 16-18. The Examiner's rationale overlooks the fact that the entrainment and mixing of the gas in the molten metal may cause significant issues in the casting of superalloys conventionally used in making directionally solidified and/or single crystal structures. Accordingly, the proposed combination of Paine and Bollig fails to establish a prima facie case of obviousness since the combination would render Paine unsatisfactory for its intended purpose.

C. The Examiner's Rejection Is Based upon Impermissible Hindsight

The Federal Circuit has repeatedly admonished that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992), *quoting In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1998). This analysis is forbidden because it would "discount the value of combining existing features or principles in a new way to achieve a new result—often the very definition of invention." *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275, 69 USPQ2d 1686 (Fed. Cir. 2004). The examiner has fallen into this forbidden analysis in rejecting the present application.

The examiner has not identified any suggestion, teaching or motivation to combine the tilt pour metal casting system of Paine with the system of Bollig. The Examiner does argue that the asserted combination "will provide gas mixing with metal the lowest part of the crucible." *See*, Office Action, page 4, line 18. Yet, as explained above the Applicants believe that a person skilled in the art will recognize that the mixing of gas with the metal will cause significant issues in casting of components of superalloys conventionally utilized in making directionally solidified and/or single crystal structures. Thus, the rejection has been made without any motivation or suggestion for the asserted combination.

A reasonable conclusion upon reading the record is that the Examiner has engaged in impermissible picking and choosing of elements found in prior art references while using the present application as a template for assembling them. For the above

reasons no prima facie case of obviousness has been established.

D. The Asserted Combination of Paine and Attenhofer Does Not Teach or Suggest All the Limitations of Numerous Claims

As stated above, a prima facie case of obviousness requires that a proposed combination of references teach or suggest every claim limitation. The examiner's rejection fails to teach or suggest every element of multiple claims. The following groups of claims are presented for independent consideration

1. The Proposed Combination Fails to Teach or Suggest The Claimed Nozzle Limitations

Claim 38 includes "a nozzle in fluid communication with said aperture . . ." Claim 39 includes "a nozzle coupled with said aperture and in fluid communication with said first cavity of the second tube. . . ." Claim 65 includes " a nozzle coupled to said crucible and in fluid communication with said discharge opening." Neither Paine nor Bollig includes any teaching or suggestion of a nozzle, let alone a nozzle as recited in any of the foregoing claims. The Office Action does not even address the nozzle limitation of any claim. For at least these reasons, the asserted combination does not teach or suggest all the limitations of claims 38, 39 or 65 and claims 40-46, 48-49 and 66-69 which depend therefrom.

2. The Proposed Combination Fails to Teach or Suggest The Claimed Sensor Limitation

Claim 48 recites "a sensor positioned proximate said outlet, said sensor detects an initial flow of molten metal from said outlet ..." Neither Paine nor Bollig includes any teaching or suggestion of a sensor, let alone a sensor as recited in claim 48. The Office Action does not even address the sensor limitation. For at least these reasons, the asserted combination does not teach or suggest all the limitations of claim 48 and the obviousness rejection of claim 48 should be reversed.

3. The Proposed Combination Fails to Teach or Suggest The Claimed Difference in Size Between the Outlet and Said at Least One Entrance.

Claim 44 recites "a difference in size between said outlet and said at least one entrance allows the volumetric flow rate of molten metal through said at least one entrance to be substantially greater than the flow rate of molten metal through said outlet." Claim 68 recites " a difference in area between said nozzle outlet and said at least one entrance allows the volumetric flow rate of molten metal through said at least one entrance to be substantially greater than the volumetric flow rate of molten metal through said outlet." ..." Neither Paine nor Bollig includes any teaching or suggestion of relative size relationship between the inlet and outlet, let alone a relationship as recited in claims 44 and 68. The Office Action does not even address the size relationship limitation. For at least these reasons, the asserted combination does not

teach or suggest all the limitations of claim 44 and 68 and claim 45 which depends therefrom.

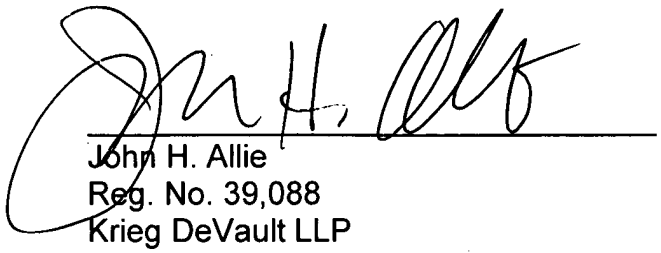
4. The Proposed Combination Fails to Teach or Suggest The Claimed the Configuration of the Passageway

Claim 73 recites "said first passageway portion and said second passageway portion and said inflection portion define a substantially U shape." Claim 79 recites "said first passageway portion tapers prior to said inflection portion." Claim 80 recites "said first passageway has a substantially frustum-conical shape part prior to said inflection portion. Neither Paine nor Bollig includes any teaching or suggestion of the configuration of the passageway, let alone a relationship as recited in claims 73, 78 and 79. The Office Action does not even address the configuration of the passageway. For at least these reasons, the asserted combination does not teach or suggest all the limitations of claim 73, 79 and 80

VIII. CONCLUSION

For the foregoing reasons, reversal of the rejection by the Appeal Board is hereby requested.

Respectfully submitted,



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EVIDENCE APPENDIX

[NONE]

CLAIMS APPENDIX

37. An apparatus for pouring a molten metal, comprising:

a crucible having a bottom wall member with an aperture formed therethrough;

an upstanding first tube positioned within said crucible and having a first end located around said aperture and coupled to said bottom wall member and another second end that is closed, said first tube having at least one entrance for allowing the passage of molten metal from said crucible to said first tube;

an upstanding second tube located within the first tube and having one end coupled to said bottom wall member and in fluid communication with said aperture and another end defining an inlet from said first tube, said second tube has a first cavity adapted for receiving a volume of molten metal therein; and

a passageway extending along said second tube for the passage of the molten metal from said at least one entrance to said inlet.

38. The apparatus of claim 37, which further includes a nozzle in fluid communication with said aperture, said nozzle adapted to deliver a substantially vertical stream of molten metal.

39. The apparatus of claim 37:

which further includes a nozzle coupled with said aperture and in fluid communication with said first cavity of the second tube, said nozzle has an inlet adapted to receive molten metal and an outlet adapted to discharge molten metal; and

which further includes a mechanical housing having a first chamber at a first pressure and a second chamber at a second pressure, and wherein said crucible is located within said first chamber and said outlet of the nozzle is located within said second chamber.

40. The apparatus of claim 39, which further includes pressure differential means for creating a pressure differential between said first chamber and said second chamber, wherein upon said pressure differential means causing said first pressure to be greater than said second pressure the molten metal within said crucible flows through said at least one entrance and into said passageway along said second tube.

41. The apparatus of claim 40, wherein said pressure differential means includes a supply of pressurized gas in fluid communication with said first chamber, and wherein said supply of pressurized gas is controlled to increase said first pressure in said first chamber.

42. The apparatus of claim 40, wherein said pressure differential means includes a quantity of unmelted metal stock extending into said first chamber, and

wherein said unmelted metal stock is advanced into the molten metal within said crucible to increase said first pressure.

43. The apparatus of claim 40, wherein said pressure differential means includes a vacuum in fluid communication with said second chamber, said vacuum being operable to reduce said second pressure.

44. The apparatus of claim 39, wherein a difference is size between said outlet and said at least one entrance allows the volumetric flow rate of molten metal through said at least one entrance to be substantially greater than the volumetric flow rate of molten metal through said outlet.

45. The apparatus of claim 44, wherein said at least one entrance defines a plurality of entrances.

46. The apparatus of claim 39, wherein said nozzle has an upstanding portion that extends into said second tube, and wherein a second cavity is defined between said second tube and said upstanding portion of said nozzle, wherein said second cavity is adapted to receive molten metal and heat said upstanding portion of said nozzle.

47. The apparatus of claim 37, wherein said first cavity defines a metering cavity holding a predetermined volume of molten metal.

48. The apparatus of claim 40, which further includes a sensor positioned proximate said outlet, said sensor detects an initial flow of molten metal from said outlet and communicates with said pressure differential means to stop creating a pressure differential between said first chamber and said second chamber.

49. The apparatus of claim 39, wherein said nozzle and said first tube and said second tube are parallel to one another, and wherein said at least one entrance is located adjacent said first end of the first tube.

63. An apparatus, comprising:

a mechanical housing

a crucible adapted to receive a metal material therein, said crucible positioned within said housing;

a heater positioned adjacent said crucible for heating the crucible and melting the metal received within said crucible; and

a pressure controlled precision pour assembly positioned within said crucible, said pour assembly has an outer cavity with at least one entrance for the passage of melted metal material from said crucible to said outer cavity and an exit for the passage of melted metal material to an inner metering cavity, and wherein said pour assembly

has a first state wherein said inner metering cavity receives melted metal material from said outer cavity until said inner metering cavity is full and a second state wherein the flow of melted metal material to said inner cavity is stopped and the melted metal material within said inner metering cavity is discharged.

64. The apparatus of claim 63, wherein said crucible includes a discharge opening, and wherein in said second state the melted metal material within said inner metering cavity flows through said discharge opening.

65. The apparatus of claim 64, which further includes a nozzle coupled to said crucible and in fluid communication with said discharge opening.

66. The apparatus of claim 65:

wherein said mechanical housing has a first chamber and a second chamber, and wherein said crucible is located within said first chamber; and

said second state discharges molten metal when the pressure in said second chamber is greater than the pressure within said first chamber.

67. The apparatus of claim 65:

wherein said crucible has a bottom wall member, and wherein said discharge opening is formed in said bottom wall member;

wherein said pressure controlled precision pour assembly includes an outer upstanding tube coupled to said bottom wall member and positioned around said discharge opening;

wherein said pressure controlled precision pour assembly includes an inner upstanding tube coupled to said bottom wall member and positioned around said discharge opening;

wherein said inner upstanding tube is positioned within said outer upstanding tube, and said outer cavity is located between said tubes, and wherein said inner metering cavity is positioned within said inner tube.

68. The apparatus of 67, wherein a difference in area between said nozzle outlet and said at least one entrance allows the volumetric flow rate of molten metal through said at least one entrance to be substantially greater than the volumetric flow rate of molten metal through said outlet.

69. An apparatus for dispensing a molten metal, comprising:

a mechanical housing having a first chamber with a first pressure and a second chamber with a second pressure;

a crucible positioned within said first chamber of the mechanical housing and adapted to receive a stock of unmelted metal material therein;

a heater positioned adjacent said crucible and adapted for heating the crucible and at least a portion of the unmelted metal material therein to a molten metal state, wherein said crucible holds the volume of molten metal melted by the heater therein;

a tube having a first end and a second end with a flow communication passageway therebetween, said first end positioned beneath a surface of the volume of molten metal within said crucible and a second end positioned in fluid communication with said second chamber and defining a discharge aperture; and

a pressure differential device within said first chamber and acting on the volume of molten metal to increase the pressure thereof and cause molten metal to flow through said passageway and out of said second end, said pressure differential device is defined by at least a portion of the unmelted metal material.

70. The apparatus of claim 69, wherein said pressure differential device defines a consumable member that is replenished by additional unmelted metal material.

71. The apparatus of claim 70, wherein said first chamber has an aperture therein adapted for the passage of the stock of unmelted metal material, and a substantially fluid tight seal is formed around the stock.

72. An apparatus for pouring a molten metal, comprising:

a mechanical housing with a bottom wall member and an interior volume adapted to hold a molten metal; and

a molten metal delivery member having a first molten metal inlet end adapted to receive molten metal from below the surface of the molten metal within the interior volume and a second molten metal outlet end with a passageway therebetween, at least a portion of said delivery member positioned within said mechanical housing, said passageway has a first passageway portion and a second passageway portion and a inflection portion wherein the direction of molten metal flow changes, in a first discharge mode a first direction of molten metal flow within said first passageway portion is from said molten metal inlet to said inflection portion and from said inflection portion through said second passageway portion in a second direction to said outlet.

73. The apparatus of claim 72, wherein said first passageway portion and said second passageway portion and said inflection portion define a substantially U shape.

74. The apparatus of claim 72, wherein said inflection portion is above the surface of the molten metal within said interior volume.

75. The apparatus of claim 74, wherein the pressure of the molten metal within the inflection portion is greater than the pressure at either of said molten metal inlet or said molten metal outlet.

76. The apparatus of claim 75, wherein said molten metal delivery member is integrally formed.

77. The apparatus of claim 72, wherein said second passageway portion defines a metering cavity.

78. The apparatus of claim 72, wherein the cross-sectional area of said passageway varies between said first inlet end and said second outlet end.

79. The apparatus of claim 78, wherein said first passageway portion tapers prior to said inflection portion.

80. The apparatus of claim 78, wherein said first passageway has a substantially frustum-conical shape part prior to said inflection portion.

RELATED PROCEEDINGS APPENDIX

While a related appeal was identified above in section II pursuant to 37 CFR § 41.37(c)(1)(ii), there are presently no decisions rendered by a court or the Board to include in this Appendix.